Systematic Innovation

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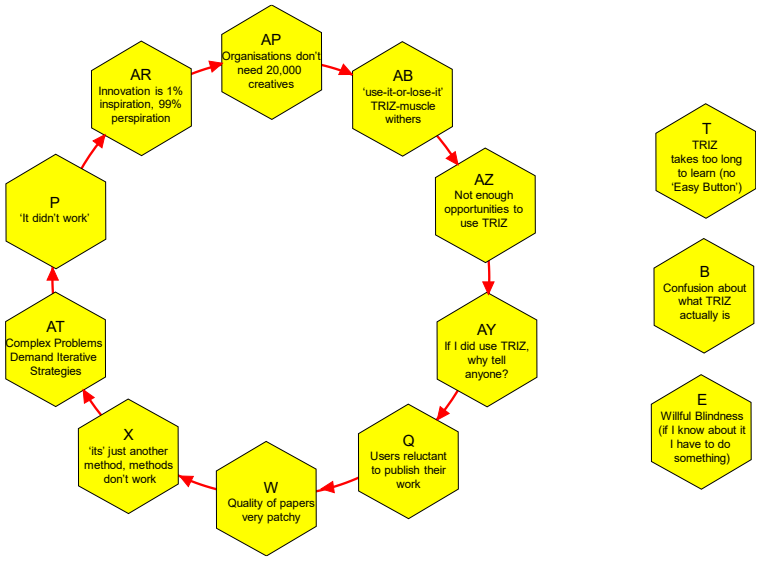
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If TRIZ Is So Good Why Isn't Everyone Using It: 2026

Time for a third round of trying to understand why TRIZ still hasn't gone mainstream. This time, not only has TRIZ failed to go mainstream, it has sunk to what I hope is the lowest point in the Trough Of Disillusionment. Our first attempt at mapping the situation was in 2003 (Reference 1). We then made a second version right at the beginning of the COVID-19 pandemic (Reference 2). The general idea at that point was we could already see that the pandemic had pushed the world off its current path (s-curve) into the uncomfortable liminal 'Special World' space between the old curve and whatever the new one is going to be, and that therefore we were entering a period in which innovation was the best way through the (omni-)crisis. As it turned out, these Special times permit only certain types of innovation by certain types of people in positions of power (Reference 3) and so probably safest to say that our expectations overshot the mark somewhat. Anyway, at the time of the 2020 version of this article we decided that, given the high state of flux during Crisis periods, we might want to re-examine the story more regularly than every 17 years. Which brings us to October 2026, and a world that already feels quite different to the world of March 2020. Even though we still haven't reached the climax of the omni-crisis. The biggest shift that we might expect to have affected the world of TRIZ is the emergence of a step-change in the capabilities of AI in general and in Generative AI in particular. Especially since, this year, we have seen the emergence of several 'TRIZ-based' AI capabilities and agents. And, things travelling at the speed of light as they do, already an awareness that such capabilities have not made a dent in innovation attempt success rates. And, where they have, the results clearly seem to show that AI is making things worse rather than better.

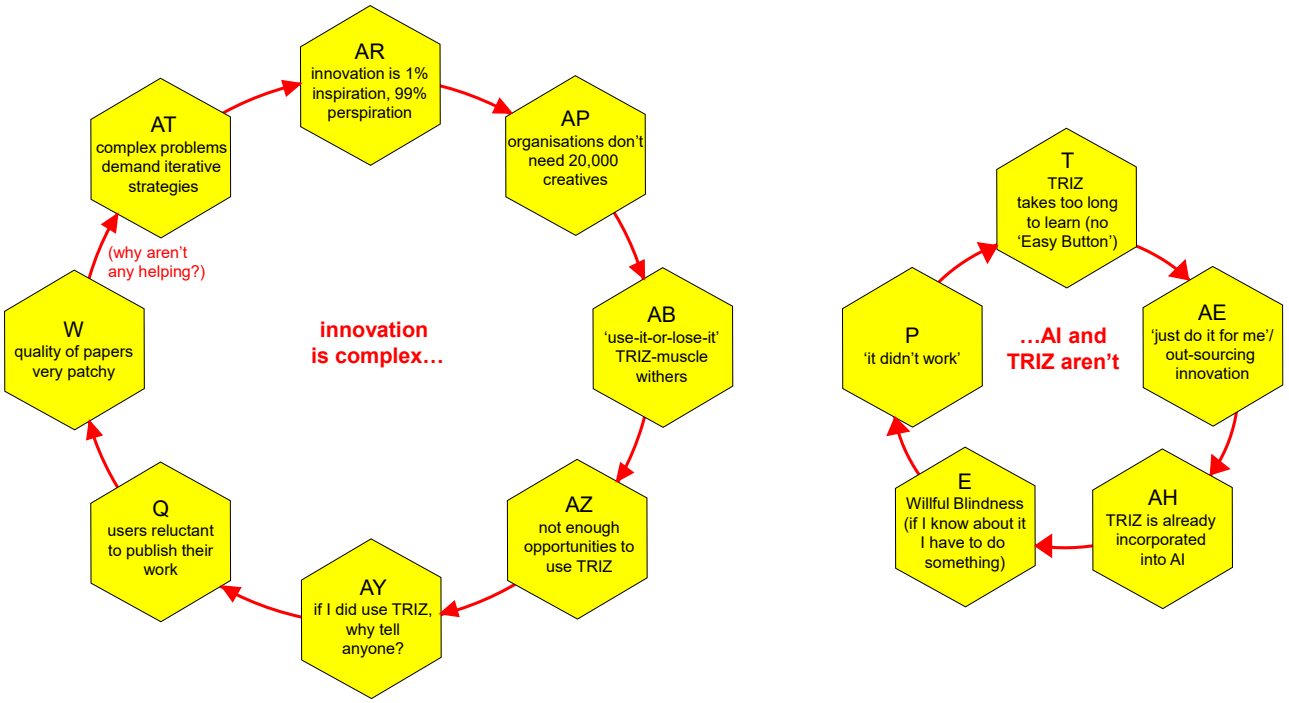
Being incredibly lazy, my first thought when contemplating this 2026 update was to review and re-use the long list of 'yes, but' perceptions that made up the 2020 analysis. The immediate result of that review was that all of them were still valid. In that sense, the TRIZ world, or rather the reasons people are overwhelmingly not using TRIZ, appears to be unchanged by the events of the last six years. Examination of the big vicious cycle loop and main collectors from that map – reproduced below – seemed to suggest that it indeed continues to be valid:



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So, also in the spirit of extreme laziness, my next shortcut idea was to simply add one new AI-related perception to the original 2020 list. The statement I opted for was, everyone isn't using TRIZ because, 'TRIZ is already incorporated into AI'. Anyone closely connected to the TRIZ world, of course, will immediately object to this statement (from my part, I know, for example, that no AI LLM has been fed with any of our Contradiction Matrix content (including the free 2003 version) and so is going to provide users capable of asking contradiction-related questions with what is essentially a 1960s answer). Here is one of those situations where perception really is reality. If people *think* TRIZ is already in AI, that is what they will base their 'do-I-need-to-learn-TRIZ-or-not?' decisions around.

Without getting into too much detail, it didn't take long for my naïve shortcut to turn into rather more work than I was anticipating. The arrival of that single new perception altered how many of the others lead from one to another. The end result was that one big vicious cycle had now turned into two. Here they are:



The vicious cycle on the left is a slightly truncated version of the original 2020 loop. It remains essentially about TRIZ being a very small part of the overall innovation job, rare skills that people don't want to share, and, overriding everything, that innovation is fundamentally complex. The new vicious cycle on the right-hand side of the figure is one that features the newly added 'TRIZ is already incorporated into AI' alongside one of the perceptions from the original loop plus two former connectors. This new loop is basically all about the fact that neither TRIZ nor AI are capable of dealing with complex situations. One way of reading this shift is that the important findings from the 2020 exercise are indeed basically unchanged – what was important then, continues to be important now – but the separation into two separate loops now makes it clearer that, while innovation is fundamentally complex, neither TRIZ nor AI are capable of dealing with that complexity.

I don't know about you, but when I first saw that conclusion my immediate reaction was something like, 'great, another blinding flash of the obvious'. Rarely the greatest feeling in the world. Even if the amount of work that got you to the conclusion, thanks to my laziness, wasn't that great. The worst part of the underwhelmed feeling was about to get worse. And another timely reminder that laziness has a way of falling foul of the Laws of Karma. AKA there are no shortcuts in life.

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The hard-work-ahead signal being that the advent of generative AI has in effect meant that the original question, 'If TRIZ is so great, why isn't everyone using it?' has become the wrong question. Rather than leading us to a root contradiction that might help think about the TRIZ issue, the real issue is that the problem needing to be addressed is now a higher level 'innovation' one. That means two things:

1) The real question is not about TRIZ, it is about 'Systematic Innovation' (i.e. what the SI team has spent the last twenty-eight years developing – a philosophy, method and toolkit capable of handling the innate complexities of innovation). Why aren't people using SI? (including almost everyone in the 'TRIZ community'?)
2) From our more parochial SI view of the world, it is fair to say that up until the last couple of months, the project work we've been asked to get involved in with clients has taken a sharp downturn (fortunately, this has been largely offset by clients asking us instead to come and teach their innovation teams to work out how to start deploying AI to help them innovate more effectively). As far as we can tell, the main reason for the project-work downturn is that everyone was doing experiments with their frontier AI models of choice to see if it was going to replace having to deal with obnoxious consultants like me. The last couple of months has offered some clear signs that AI isn't helping them at all, and that they are indeed going to have to re-contemplate biting the bullet and giving us a call. The emerging upshot of these shifting project sands is that the world has attempted to build some kind of AI/innovation mash-up and is beginning to realise it makes things worse rather than better.

Through gritted teeth, I was forced to admit that these two factors meant it was necessary to build a whole new Perception Map. One based around a question something like, 'If AI has got TRIZ in it and lots of people are trying to use AI to help them to innovate, why isn't it working?'

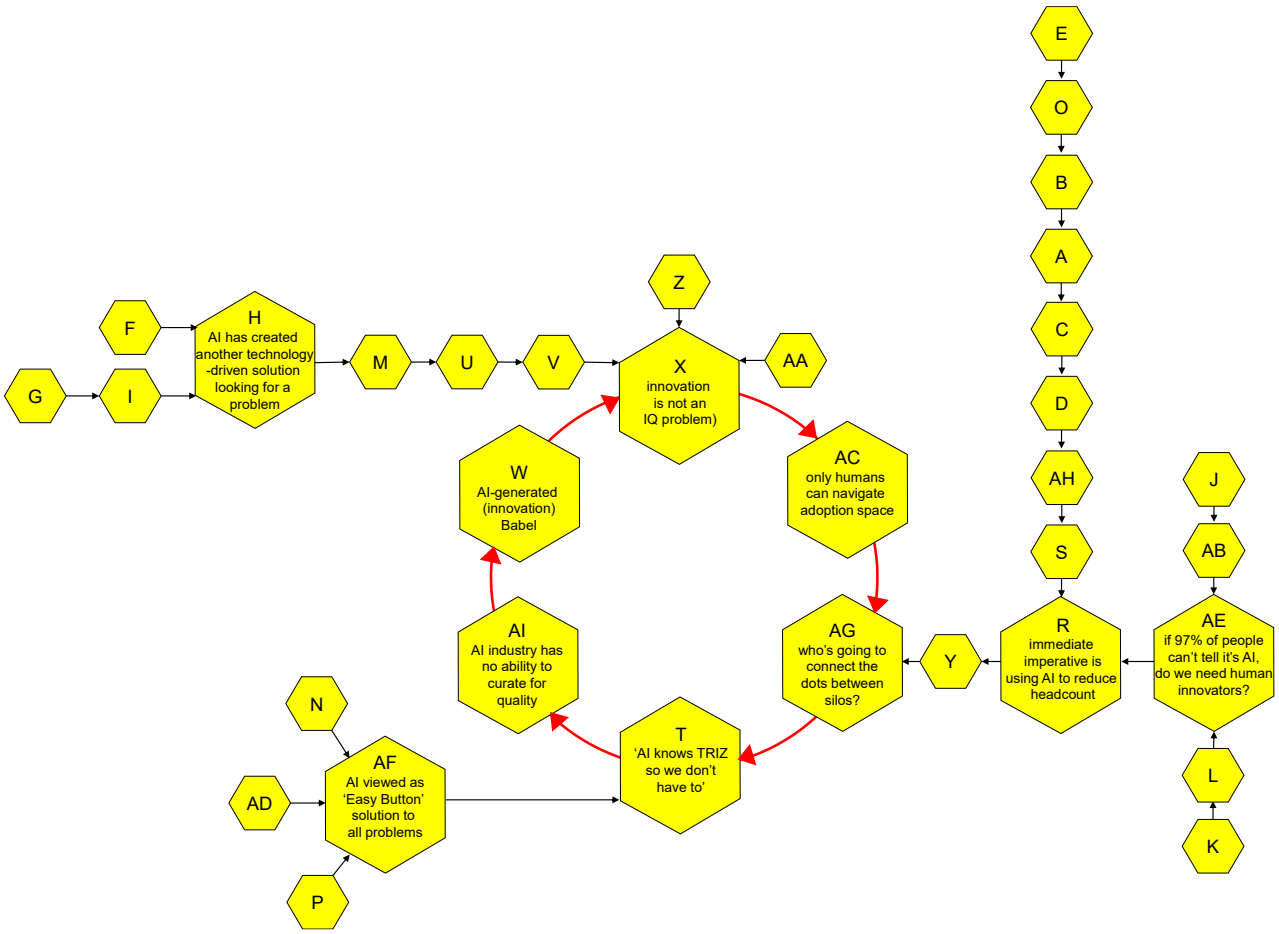
(An immediate clue, of course, comes from the update of the 2020 TRIZ-focused analysis, and the realisation that while TRIZ might be 'in' the AI LLMs, SI absolutely isn't. If neither AI nor TRIZ can 'do complex' and innovation is complex, of course they won't help. Rather than jump on that clue, now I was in anti-lazy, ultra-'is-that-really-true' thinking mode, I held back from jumping to conclusions, bit the proverbial Perception Mapping bullet and made a new list of perceptions to attempt a comprehensive analysis of the bigger AI/innovation picture. Here's the list I created, and the subsequent leads-to analysis:

	Perception	Leads To
A	AI programme has become the innovation programme	C
B	'Our AI strategy is our innovation strategy'	A
C	Innovation budgets being transferred into AI transformation	D
D	Leaders want visible AI projects not invisible thinking capability	AH
E	AI easier to demonstrate to Board than systematic problem solving	O
F	'We're experimenting with AI' as substitute for actual problem solving	H
G	Everyone is busy implementing AI, no-one has time to innovate	I
H	AI has created another technology-driven solution looking for a problem	M
I	AI enthusiasm creates a form of technological solutionism	H
J	'We can just ask the model' creates a new version of 'just do it'	AB
K	Polished AI output makes mediocre new solutions look impressive	L
L	The organisation confuses fluent language with insight	AE
M	The organisation confuses novelty with invention	U
N	The organisation confuses invention with innovation	AD
O	Easier for leaders to 'go with the AI flow' than justify why they're not	B

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P	The only way to compete with China is better AI/automation	AD
Q	‘We can’t catch up so there’s no point starting’	X
R	Immediate imperative is using AI to reduce headcount (‘managed decline’)	Y
S	Using AI to increase operating efficiency is the innovation	R
T	‘AI knows TRIZ so we don’t have to’	AI
U	‘AI gives us infinite solutions’	V
V	AI moves innovation bottleneck downstream of ideation (SRL2+)	X
W	AI creates plausible nonsense at an industrial scale (‘Babel’)	X
X	Innovation isn’t an IQ problem	AC
Y	Siloed AI usage locks inefficiencies in and reduces overall effectiveness	AG
Z	AI can’t do unknown-unknowns	X
AA	AI can’t do tacit knowledge	X
AB	AI use create rapid cognitive muscle atrophy	AE
AC	AI explores solution space; only humans can navigate adoption space	AG
AD	If AI can generate ‘all’ solutions, it’s a race to own them before others	AF
AE	If 97% of humans can’t tell output is AI, do we need human innovation?	R
AF	AI viewed as ‘Easy Button’ solution to all problems	T
AG	Who’s going to connect the dots between silos?	T
AH	Leadership looking for some quick wins to justify AI investment	S
AI	AI industry has no ability to curate for quality of incoming data	W

And then, here’s what the resulting overall Perception Map looks like, highlighting what turned out to be the one loop and four driving collectors:



The vicious cycle loop is worth talking through in a little more detail to capture the logic flow. It doesn’t particularly matter where we start in the loop, but let’s start where most

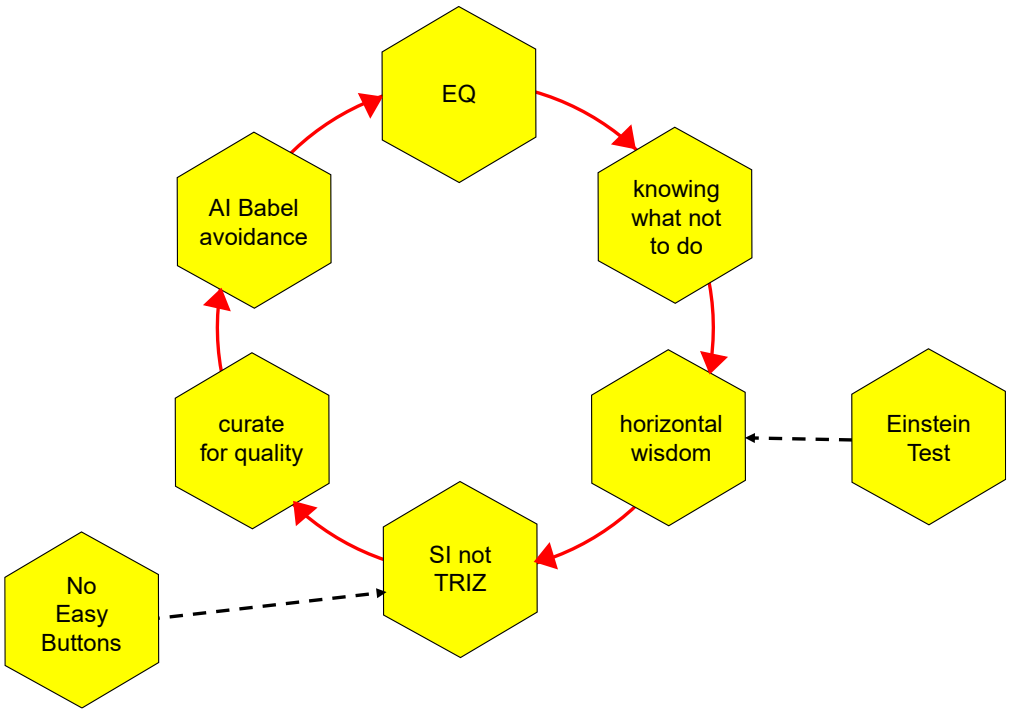
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people's eyes naturally tend to go… the 12 o'clock position: which states that innovation is not an IQ problem (Perception X). That leads to a recognition that there are aspects of the innovation challenge that only humans can do, and that the main one is deciding. AI and humans both can generate an infinite number of solution ideas, that's not the difficult bit. The difficult bit is deciding which of the ideas should *not* be pursued, and the best way to decide that is to examine the 'adoption space' (AC), i.e. which fit best with market needs, both spoken and (especially) unspoken. Recognising that the innovation bottleneck is deciding what not to do leads to the need for a meaningful process, and that process necessarily needs to be able to incorporate the views and perspectives of each part of the surrounding ecosystem and all the silos within it. That in turn means what we have been describing as 'horizontal wisdom' – the ability to connect the dots between the various parts, recognise and solve the misalignments and contradictions (AG) (References 4, 5 and 6). In terms, then, of who or what is best placed to do that dot connecting job, in theory at least, the answer is TRIZ. 'Someone, somewhere already solved your problem' – in many ways the DNA of TRIZ – is the ultimate form of horizontal wisdom. The person that solved your problem is not in your domain of expertise. The fact that TRIZ has been 'incorporated' into frontier AI LLMs (T) means that when (if!) people ask the 'where do I get horizontal wisdom from?' question, the answer is 'AI'. The reality, of course, is that very little actual horizontal wisdom from TRIZ has been part of that absorption into AI. Some of the simple/ complicated aspects have, yes, but none of the content relating to complex situations (i.e. 'Systematic Innovation') have. Recognising this fact leads to the more general realisation that not only has the majority of TRIZ/SI not been integrated into the LLMs, the AI industry has done a terrible job of curating the knowledge it absorbs across all the other domains of human knowledge (Perception 'AI') (we will return to this issue in more detail later). Then, because, there has been little meaningful curation of TRIZ or any other knowledge – compounded these days by 'synthetically generated' knowledge that has rapidly become a classic case of 'the blind leading the blind' – the end result is enormous amounts of data, the vast majority of which is noise. The world will apparently run out of energy to power all the data centres required in the not too distant future, but has simultaneously failed to recognise that most of that energy will be consumed in analysing garbage (W). The net consequence of that is the world increasingly finds itself in a Tower of Babel situation in which no-one can distinguish between fact and fiction any longer. Knowledge wants to be free, but the more of it there is, the more expensive it becomes to identify the contextually relevant useful bits. That then, naturally, leads to enormous dysfunction in all aspects of life, but particularly our collective ability to get new things done. Ergo, the growing realisation that innovation is not an IQ challenge, but rather one heavily dominated by EQ. Or, to paraphrase Tom Peters, 'hard is soft, soft is hard'. And so the nightmare swirl accelerates and accelerates until either the whole shebang explodes, or (preferably) someone starts solving some contradictions.

On the next page is a possibly more succinct and ideally memorable way to picture this vicious cycle. Or rather, trying to shift the thinking from what's-the-problem to what-are-we-to-do-about it, what are the things that need to be done to break the cycle?

More specifically, perhaps, what can the TRIZ/SI community do to help prevent the world falling into an existential Babelian nightmare?

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The biggest one, I believe concerns curation. For a start, the AI industry doesn't know how to do it. That's not a criticism so much as a realisation that the world has a broader problem of *who decides what is high quality and who decides what isn't*?

At the very beginnings of what became the TRIZ programme of research, founder Genrikh Altshuller had his own version of the 'who decides?' question. His specific form related to patents. Who decides that this patent is better than this one?

The best way to start answering that question was to make a hypothesis that the market decides. If two patents, A and B, both solve the same customer problem, and customers decide that A does it better than B, than patent A is the better patent.

It's a hypothesis at least. Fraught with uncertainties no doubt, but a good enough start point for the real answer to the who-decides question to emerge: value decides. The product delivering the highest value (benefits-divided-by-cost-and-harm) wins. At least in the longer term. The chaotic short term is easily dominated by a spectrum of human quirks, but the cream eventually rises. Not always fast enough for the original entrepreneurs to benefit from their inventions, but, higher value wins in the end.

Drag this story forward to the present day – a time of 'alternative facts', half-truths and fake-news (Babel V1.0) – and it becomes increasingly difficult for researchers to identify what's useful and what isn't. Not least because the people generating new content are, we now know, highly prone to the full gamut of human biases. High on the list, as far as our own research 'is that really true?' efforts concerns where the discovery of a new piece of knowledge sat along the spectrum from Simple through Complicated and then Complex, and potentially, through to Chaotic (as found in much early-stage research). If a researcher, for example, treats a situation as Simple or Complicated when it is in fact Complex that can only mean that the conclusions they draw are at best wrong, and at worst, likely to create a plethora of unintended consequences. Think the entire pharmaceutical and big-agriculture industries. Knowledge that draws Simple conclusions from Complex situations is better labelled as 'noise' and, in a more resilient world than the one we currently inhabit, would be excluded from any kind of AI LLM. That's not what

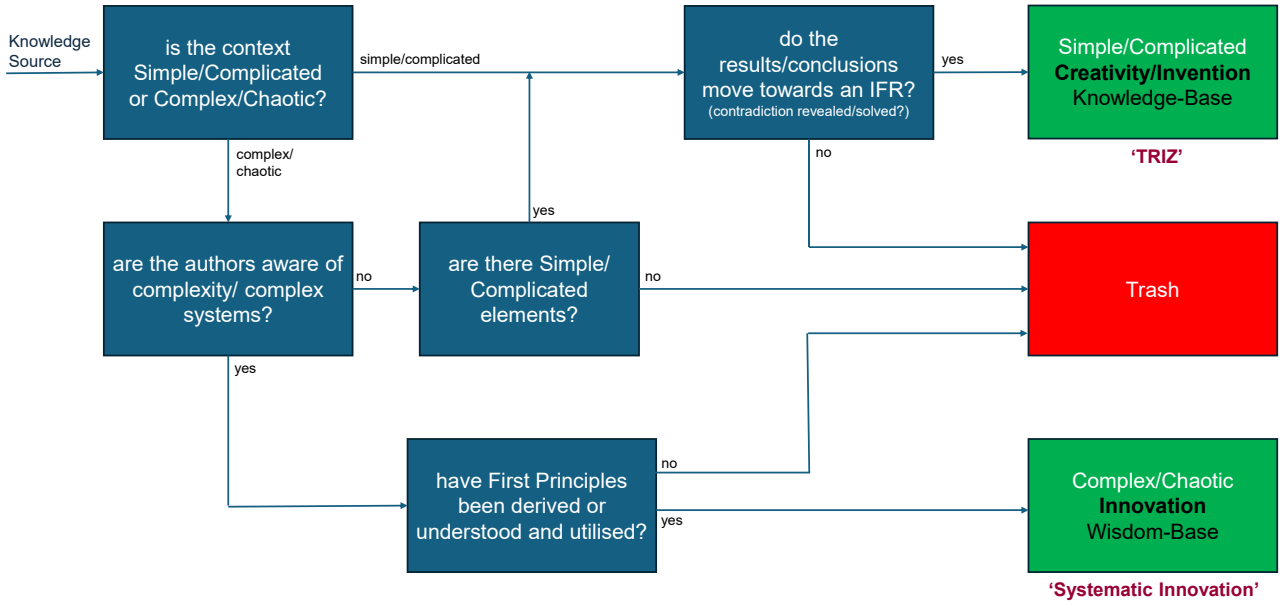
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happens, of course. It needs to though (unless your business model depends on creating Babel!).

Altshuller didn't understand the difference between Simple, Complicated or Complex either, but because the patents he analysed focused on purely technical problems and especially ones involving the resolution of contradictions, he in effect created an amazingly well curated database of excellent solutions for Complicated problems.

What we (SI) then tried to do is extend beyond the technical into the world of fundamentally complex market, organisational, business and anthrocomplex domains. Fortunately, making use of Altshuller-equivalent first-principle thinkers like Clare Graves, Stafford Beer, W. Ross Ashby, Jospeh Campbell, Edward DeBono, Christopher Alexander and many others, has meant we get to stand on the shoulders of giants and – contradiction-solving all the way – end up with what we believe to be the world's most effective means of curating knowledge, and as best as we can serve the imperative of answering the 'is that really true?' questions that need to be addressed if we're going to help clients end up in the 2% of innovation projects that end up being successful.

Here, for the first time outside the company, is the high level glimpse at what that curation process is:



TRIZ gave us the foundations, now, we believe we have developed a repeatable, mostly-automated AI-driven process of stripping the noise out of the global knowledge base and leaving behind only the signal.

The AI industry may end up not obtaining the curation skills they need from us, but there's no doubt in my mind that, however they get them, they will eventually converge on the basic steps described in this process map.

Either way, too, the AI industry needs TRIZ knowledge. Or rather a properly curated version of it. Safe to say, examining papers presented at TRIZ conferences over the last three decades, most fail the Complexity test and therefore need to be removed from the LLMs.

A properly curated TRIZ knowledge-base, in other words, is the solution to the current AI industry Hype Cycle problem. For Simple and Complicated problems.

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For Complex and Chaotic problems, they need the Systematic Innovation equivalent. With that, they get to build in a first principles understanding of the EQ story, genuine Horizontal Wisdom, and consequently the next paradigm shift that will take the industry past Demis Hassabis' Einstein Test. More on that little challenge in Reference 7.

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Finding the Edge: Rethinking Principle 16

“Beyond the edge of the world there’s a space
where emptiness and substance neatly overlap,
where past and future form a continuous, endless loop.
And, hovering about, there are signs no one has ever read,
chords no one has ever heard.”
Haruki Murakami

"The opposite of a fact is falsehood,
but the opposite of one profound truth may well be another profound truth."
Niels Bohr

Ask experienced TRIZ practitioners which of the 40 Inventive Principles they find least inspiring, and Principle 16 often appears somewhere near the top of the list. Remembered as *Partial or Excessive Action* or *Slightly Less, Slightly More*, it is usually illustrated with examples that feel distinctly incremental. Overfill a hole before sanding it flat. Pour a pint of Guinness in two stages. Leave a little extra material for machining before removing it later. These are perfectly respectable engineering strategies. They replace one difficult operation with two easier ones, reducing the demand for precision during the first one.

But they rarely trigger the kind of paradigm-shifting ideas that TRIZ is there to help spark.

Perhaps we've been underestimating Principle 16 though. Perhaps, thinking about the famous Niels Bohr quote above, Principle 16 may also be one of those profound truths hiding in plain sight. It appears to describe compromise and adjustment, yet perhaps its real power lies in something much more dramatic: what happens when a system approaches the edge of change.

Consider three rather different examples…

The first concerns people who survive a near-death experience. Not everyone who comes close to death undergoes a profound change in outlook, but many report that the experience fundamentally reshapes the way they live afterwards. Priorities change. Relationships change. Careers change. Life itself acquires a different meaning.
The difference between dying and almost dying may appear very small in one sense, yet for some survivors the consequences are transformational.

Input: Almost die.
Output: Entire life philosophy changes.
Tiny difference: Dead versus almost dead.
Enormous change in outcome.

The second example comes from an altogether less uplifting source: gambling. Designers of slot machines and lotteries have long understood that the most powerful motivation to keep players playing often comes not from winning but from *almost* winning. A result that falls agonisingly close to the jackpot encourages many players to continue far longer than a clear loss would have done. Behavioural psychologists call this the "near

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miss" effect. The objective outcome is identical – a loss – but the subjective response is dramatically different. A tiny change in outcome produces a disproportionately large change in behaviour.

Input: Lose by an extremely small margin.
Output: Motivation increases.
The player objectively loses exactly the same amount of money.
Yet psychologically, losing badly is very different to losing narrowly.

Our third example comes from music. Think of the extraordinary appeal of close-harmony singing. The Everly Brothers singing in diatonic thirds remain perhaps the classic example. The timbre of their voices were not identical, yet they were remarkably similar in tone, timing and phrasing. The slight differences between them created harmonics, richness and emotional warmth that neither voice could produce alone. Had the voices been completely identical, much of the effect would have disappeared. Had they been more different, the harmony would have lost its unique character. Once again, "almost the same" proves to be something entirely different from "the same."

Input: Two almost identical voices.
Output: Richness, emotional warmth and resonance.
If the voices were identical, much of the magic disappears. If they were too different, the harmony falls apart.

At first sight these three stories appear to have little in common. One concerns mortality. One concerns addiction. One concerns music. Yet they all reveal the same underlying mechanism.

Each sits close to a boundary where a very small movement in one direction produces an unexpectedly large change in outcome. They are not examples of simple incremental improvement. They are examples of exploiting proximity to a tipping point.

Perhaps this is the richer interpretation of Principle 16. Rather than asking whether we should do something slightly more or slightly less, perhaps we should ask where the nearest discontinuity lies. Where is the point at which perception changes? Where does behaviour suddenly shift? Where does a system move from one state into another? Viewed this way, Principle 16 becomes far more than a reminder to leave machining allowance. It becomes a search strategy.

When faced with a difficult problem, look for the edges.

Ask what happens when something becomes almost complete, almost impossible, almost silent, almost symmetrical, almost stable, almost touching, almost broken, almost boiling, almost perfect.

The goal is not necessarily to cross the boundary. Sometimes the greatest opportunities lie in approaching it without quite getting there.

Many of nature's most remarkable phenomena occur close to critical points. Human psychology, economics, music, engineering and biology are equally full of situations in which tiny changes in input produce disproportionately large changes in output. Those are precisely the kinds of situations where breakthrough innovations are most likely to be found. Butterfly Effects.

Perhaps we've been asking Principle 16 the wrong question. Instead of asking, "Can I do slightly more or slightly less?", we might ask, "Where is the nearest edge?" Because at the

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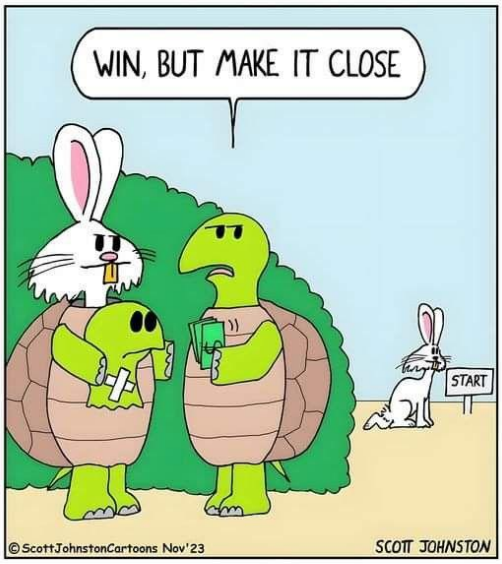
edge of every system lies the possibility that a tiny nudge will produce a dramatically different world.

Maybe a name change wouldn’t be completely out of order?

Principle 16, Exploit Edge Effects, possibly, or…

Principle 16, Exploit Tipping Points, or…

Principle 16, Almosts



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Not So Funny – Single Use Plastics Directive



The Basic Laws Of Human Stupidity #97761. What's more annoying than the well-intentioned, under-informed individual? Possibly the well-intentioned, under-informed group. Or government agency. Like for example the authors of the EU's 2019 Single-Use Plastics Directive. To some, the pinnacle of European innovation of the last thirty years. While other nations were piddling about designing retrievable rockets, generative AI and fusion reactors, Europe was busy making sure we wouldn't lose the caps off our dead Evian bottles.

In fairness, of course, according to research from the European Commission, plastic bottle caps are among the most common items of litter found on coastlines. They fall within the top five most common pollutants on the shores of the North and Black Seas, and the top three near the Baltic and Mediterranean – constituting up to 14% of all the waste found in the latter case. Stichting De Noordzee also claims to have identified between 20 and 128 bottle caps per kilometre on the Dutch coastline of the North Sea, attributing more than 80% of the 10,004 collected in total to food and drink packaging.

Moreover, Ocean Conservancy cited bottle caps as the fourth most collected item of waste worldwide in 2023 – the second most collected in North America, the third in Latin America, and the fifth in the Caribbean and Central and South Asia. It is not only humans paying the price, either; this past summer, an endangered Northern Royal Albatross chick in Pukekura, New Zealand was found to have regurgitated four plastic caps, among other pollutants.

In response, Article 6 of Directive (EU) 2019/904 – the Single-Use Plastics Directive – states that single-use beverage containers of up to 3L in size "may be placed on the market only if the [plastic] caps and lids remain attached to the containers during the products' intended use stage." As of July 2024, this Directive has entered into force and is legally mandated across the EU.

Aside from the discovery that the Single-Use Plastics Directive was the 904th directive published during 2019 – the thought of which is enough to make me start thinking Brexit was a good idea after all – I guess my Basic Laws Of Human Stupidity objection is that the

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Directive sought to solve one problem but made no parallel suggestion that the problem should be solved without creating dozens of new ones.

All of them relatively small, naturally, but nevertheless, the result is emblematic of large parts of the sustainability movement: in order to save the planet, we must all endure some form of permanent hair-shirt penance for our earlier sins. Not being able to drink from the bottle because the fucking cap gets in the way, driving on the motorway not looking at the traffic because I'm trying to get the sodding lid screwed back onto the bottle, losing multiple pairs of nail-clippers having to carry them around to hack away at the tethers holding the cap to the bottle. Not to mention cutting myself because the nail-clippers aren't quite the right shape or size… or maybe I should be thinking of that as an innovation opportunity? (Maybe the EU weren't so dumb after all?)

The point here is it's a contradiction. I don't want to choke albatross chicks AND I don't want cap scars on my septum or having a 70mph collision with another car where the driver also isn't looking at the road because they're trying to get their tethered cap back on their Sprite Zero.

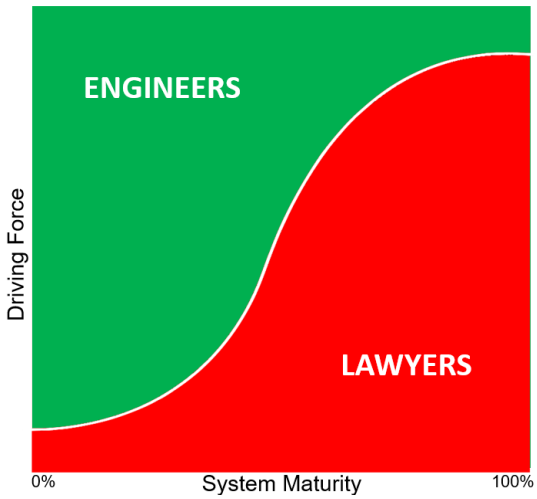
It's not rocket science.

It's called thinking about the potential downsides of a decision, recognising the trade-off, and then – if it is absolutely necessary to write yet another Directive – requesting that suppliers solve the contradiction. Or, better yet, mandating that they solve the contradiction.

Preferably, it is about not writing another Directive.

From memory, there was a dim distant time when we called this 'common sense'.

It was a time before the lawyers took over.



(I am getting old.)

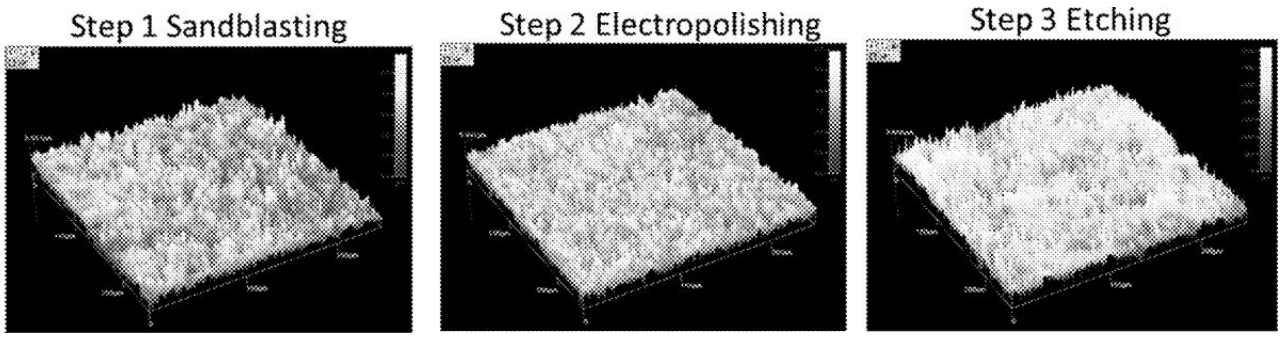
(I did make a Contradiction Matrix though.)

(It even has a specific set of recommendations for situations where we don't want to Lose A (cap-like) Substance, and we also don't want to create any Object Generated Harmful Effects like motorway crashes or bleeding septums.)

(PS: Does the fact that the albatross chick regurgitated the four caps it ate mean that it also exhibited common-sense?)

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Patent of the Month – Robust Hydrophobic Surfaces



I can't count the number of times we've talked about and advocated for the use of superhydrophobic 'self-cleaning' surfaces in the SIEZ. Lots of talk, but very little commercial deployment. The problem usually being one of durability. Which raises the question, can we make materials that behave like a lotus leaf, without creating surfaces that lose their magic the moment they encounter the real world?

Some innovations are held back not by a lack of scientific understanding, but by the difficulty of turning that understanding into something that can be manufactured economically, used reliably and made to last. This month's patent is a good example. Granted on 6 October 2026 to a trio of inventors in Hong Kong, US 12,753,490, *Method for Forming Robust Hydrophobic Surfaces on Steel Workpiece*, tackles a deceptively simple problem: how do you make steel repel water, and keep it doing so after repeated abrasion and cleaning?

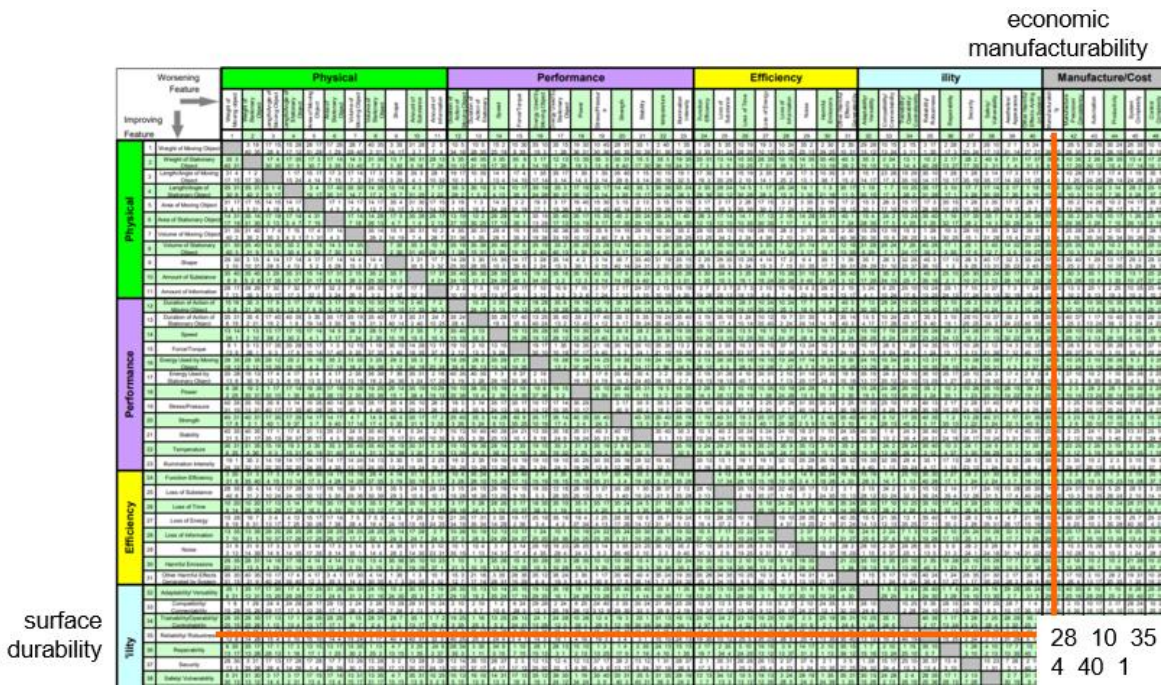
The idea of water-repellent surfaces is hardly new. Nature has been demonstrating the principle for millions of years. The lotus leaf, for example, has a remarkable ability to shed water droplets, taking dirt and other contaminants with them. Scientists and engineers have long sought to reproduce this behaviour in manufactured materials, with potential applications ranging from self-cleaning surfaces and corrosion protection to anti-icing and reduced friction.

The challenge is that creating a surface with impressive water-repellent properties in the laboratory is one thing. Producing a durable, economically viable version that can withstand the rigours of industrial use is quite another.

Superhydrophobic surfaces are generally defined as those with a water contact angle greater than 150 degrees. Imagine placing a droplet of water on a surface. Rather than spreading out, it forms an almost spherical bead, with very little contact between the water and the material beneath it. Achieving this effect requires two things. First, the surface needs an appropriately engineered micro- and nanoscale texture. Second, its chemistry needs to discourage water from wetting it.

The difficulty is that the delicate surface structures and coatings responsible for these properties can be vulnerable to wear. Abrasion, washing and everyday handling can progressively destroy the very features that make the surface work. A spectacular laboratory demonstration can therefore become a rather disappointing commercial product. Here's an iconic example of a manufacturability-versus-durability conflict. And here's what the Contradiction Matrix recommends based on those that have successfully tackled the problem before:

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The inventors behind this patent have taken a different approach: rather than treating the water-repellent coating as a layer simply sitting on top of the steel, they (Principle 10) engineer the steel surface so that the coating can penetrate into its microscopic landscape. Think of the difference between painting a smooth wall and applying a coating that can anchor itself into a carefully prepared, textured surface. The latter has the potential to be much harder to dislodge.

The patented process uses (Principle 1) three stages to prepare the steel. First comes sandblasting, which creates the initial roughness. Next, (Principle 28) electropolishing removes microscopic peaks, burrs and defects. Finally, chemical etching creates a more intricate surface structure, described in the patent as resembling that of a lotus leaf. And only then is the hydrophobic coating applied.

The patent describes two alternative routes for this final stage. One uses physical vapour deposition (PVD) to apply a fluorine-containing polymer coating, with perfluoroalkoxy (PFA) among the preferred materials. The other uses a sol-gel process to create a silica/epoxy resin hybrid coating. Both approaches aim to deposit the water-repellent material into the surface's microscopic recesses, providing a more robust interface between the coating and the steel. The significance lies in the (Principle 40) combination. Surface preparation, texture and coating are designed as an integrated system rather than as independent steps.

For me, the wider significance of this patent lies in the tension it addresses. Innovators frequently discover ways to make something perform exceptionally well under controlled conditions. But the characteristics that produce that performance can make the technology difficult to manufacture, scale or maintain. This is the familiar conflict between performance and manufacturability, with durability adding a further complication.

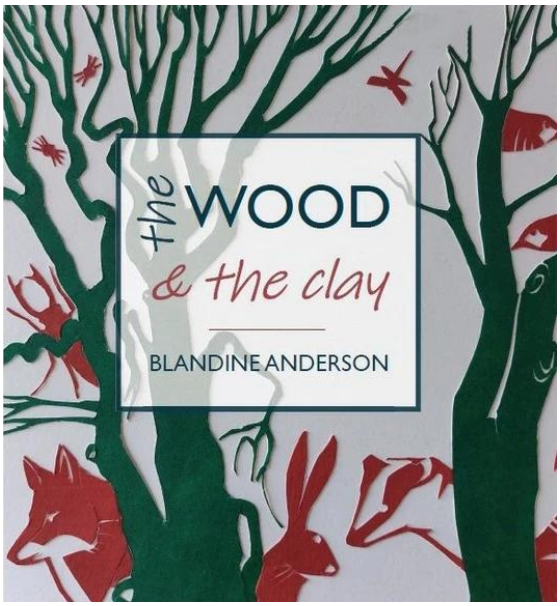
The answer is not to optimise the coating, the manufacturing process or the surface texture in isolation. But rather to redesign the relationship between them. That is what makes this patent worth watching. It combines established processes in a carefully engineered sequence to address a practical limitation that has constrained the usefulness of water-repellent surfaces.

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Whether it ultimately enables widespread commercial adoption remains to be seen. But it illustrates an important principle of innovation: the distance between a brilliant scientific idea and a useful industrial technology is often bridged by solving the less glamorous engineering problems. Sometimes, the real breakthrough isn't discovering how to make water roll off a surface. It's discovering how to make it keep rolling off.

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Best of the Month – The Wood And The Clay



"I am the rabbit running back into the forest.
This is my sanctuary, this is life.
It is the place from which creativity springs."

There's a particular kind of vulnerability involved in making art. You notice something that other people seem to have missed. You feel compelled to do something with it. You work at it, shape it, bring it into the world… and then you wait to see whether anyone else can see what you saw.

What if they don't?

This is one of the questions that stayed with me while reading *The Wood and the Clay*, the new book by artist Blandine Anderson, and it was a theme that came through in our recent conversation on the DangerMouth podcast. Blandine paints and works with clay, creating sculptures that predominantly feature birds or animals within their ecological contexts. Her work invites us to look at the natural world, but also to look again: beyond the obvious image, beyond the first impression, towards something more ambiguous and more difficult to articulate.

I have a particular affection for Blandine and her work, so I was interested not just in what she makes, but in the thinking, doubts and discoveries behind it. What emerges from the book is a portrait of creativity as something less tidy than we might imagine: part observation, part instinct, part discipline, and part willingness to follow an idea without knowing quite where it will lead.

One passage that particularly struck me concerns her childhood experience of a maths exam. She describes how she pictured groups of animals in her mind, moved them around mentally and arrived at the correct answer. But her teacher wanted to see the workings. Her method was "despised and disallowed". "It was the method that was being taught, not achieving the correct result," she reflects. It's a small story with a surprisingly large shadow. How often do we mistake the accepted process for the purpose? How many ways of seeing, thinking and creating are dismissed because they don't follow the approved route? Blandine's childhood experience seems to anticipate the artist she would

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become: someone who takes pleasure in noticing what others have overlooked, and who is prepared to trust a way of seeing that may not be immediately understood. As she puts it, “I have developed a perverse delight in noticing things that others have not seen or appreciated.”

That delight, however, comes with a responsibility. The artist’s task isn’t simply to reproduce what has been noticed. Blandine is explicit about the difference between capturing an image and making something of it. The danger, she writes, is bringing back an image as a souvenir, “just for the sake of it”. Instead, the artist must distil the qualities that attract them, add something new, give the image a twist, and create something different.

This seems like a description of creativity well beyond art. It’s the difference between copying what already exists and discovering what else it might mean. The raw material may be a bird, a seal, a mythical beast, a memory or a landscape. The work begins when the artist finds something in it that wasn’t quite visible before, something that might resonate with another person, perhaps even something they didn’t know they had been missing.

Blandine also describes the freedom of working in clay, when the conscious mind has done its initial guiding and the hands begin to take over. “This is where true creativity is to be found,” she writes. “After all, creativity flows through the fingers.” I like the way this places thought and instinct alongside one another. Creativity isn’t simply a matter of having an idea and executing it. Nor is it entirely a mysterious force that arrives from nowhere. There is an initial intention (a “mission statement” is the term she uses early in the book), but then a point at which the material, the hands and the process begin to contribute something of their own. The maker has to be attentive enough to recognise what is emerging, and open enough not to force it back into the shape of the original idea.

There is another dimension to Blandine’s work that I found myself thinking about through a rather unexpected comparison: the actor Tim Roth, who once described his approach to playing characters in terms of finding the darkness in a good character and the goodness in a villain. It strikes me that Blandine is interested in a similar refusal to settle for the obvious. Nature is often presented as something uncomplicatedly beautiful, something to admire from a safe distance. But the natural world is also fragile, brutal, interdependent and indifferent to our desire for a comforting picture. Light and dark coexist. Beauty doesn’t cancel out vulnerability; sometimes it makes us more conscious of it.

To look closely at an animal is to see more than a charming creature. It is to encounter a life within a web of relationships and dependencies, a life that may be precarious, resilient, vulnerable or strange. Blandine’s work, as I understand it, asks us to stay with that complexity rather than reduce it to a pretty image. The point isn’t to make nature less beautiful, but to make our appreciation of it more complete.

And yet, near the end of the book, Blandine makes a deeply vulnerable admission. Despite her efforts to communicate “something of the wonder and fragility of the natural world”, she writes, “I don’t think I have really succeeded.” Her pieces are often regarded as merely decorative, she says, and many people don’t look beyond that. “The work is therefore largely voiceless, and I have turned to writing as a more direct method of communication.”

It’s a poignant moment because it reveals the gap that can open up between what an artist intends and what an audience receives. The maker may invest a work with layers of observation, thought and feeling, only to discover that others see something quite

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different… or perhaps even nothing beyond its surface. It takes courage to acknowledge that possibility, particularly when the work itself represents so much care and attention. I also wonder whether the writing is, in a sense, an extension of the same creative impulse. If the sculptures and paintings have not always communicated what Blandine hoped they would, the book offers another way in. It doesn't invalidate the art; it gives us a companion route towards understanding it. And in describing her doubts, she allows us to see something that might otherwise remain hidden: the person behind the work, still trying to get closer to what she wants to express.

The book's final pages return us to the wood of the title – a wood where Blandine played as a young child, and which has become a source of metaphor for her creativity. The closing image is of a rabbit disappearing back into the forest: "I am the rabbit running back into the forest. This is my sanctuary, this is life. It is the place from which creativity springs."

Then comes the book's final sentence: "And there is clay beneath the roots." An ending I find quietly beautiful. The forest is a place of refuge, but it is also a place of origin: a landscape of memory, sensation and imagination from which the work can emerge. The rabbit is returning to the source, not abandoning the world. And the clay beneath the roots brings us back to the material from which something tangible can be made. There is a lovely circularity here. The child who saw the world in a way her teacher couldn't accept becomes the artist who tries to communicate what others might not immediately see. She returns to the wood, to the source of her imagination, and finds there the material possibility of making something real.

Perhaps that is one of the quiet lessons of *The Wood and the Clay*: creativity requires both the freedom to disappear into the forest and the patience to dig deep beneath the wood's roots and bring something meaningful back. It asks us to trust what we notice, to accept that we may not be understood, and to keep working at the difficult business of giving form to something that matters. And perhaps, too, it asks us to look a little longer at the work of others, to resist the easy judgement that something is merely decorative, merely strange, or merely familiar. There may be more beneath the surface than we first imagined. Sometimes the invitation is simply to look again.

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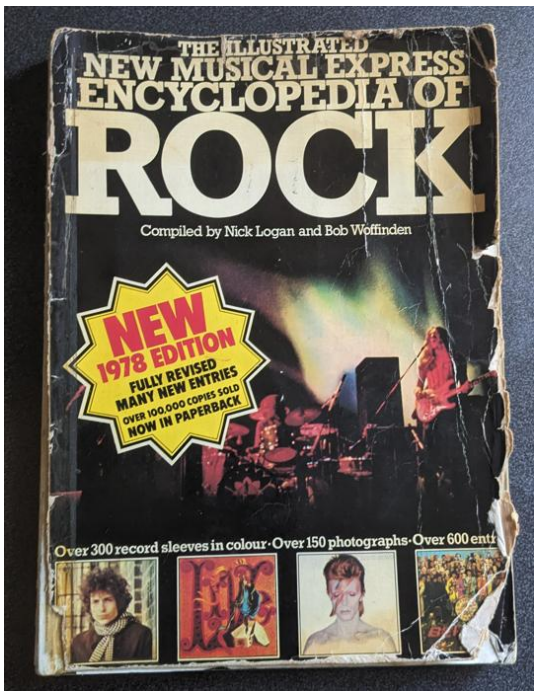
Wow In Music – Trout Mask Replica

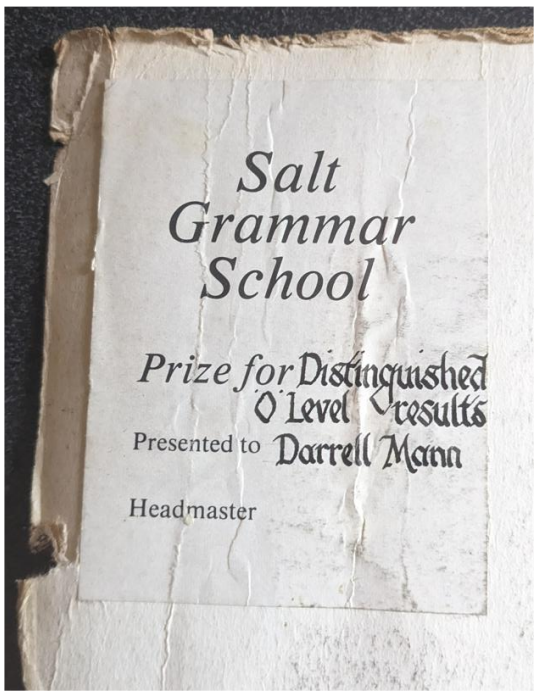


When I was sixteen, I somehow managed to win a book token for my exam results. I was already, by this time, completely absorbed by music. Initially, it was progressive rock, but then I was thoroughly swayed by the revolution that punk brought. It was also a very competitive time among friends, mainly about who could discover the best albums, the more obscure the better.

I bagged Deep Purple and Yes. Others got Zeppelin, Genesis, Rush and Sabbath, so officially I wasn't allowed to say nice things about them. Having allocated the big bands, the deep-dive searches for more obscure and out-there bands to claim were on.

There was only one way my book token was going to be spent. I needed the best resource of the day: *The New Musical Express Encyclopedia of Rock*. I still have it today. It's a little worse for wear, but that's because its pages are far and away the most pored-over of any book I own.





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Every positive review, every obscure recommendation, had to be investigated. I got a Saturday job at my local library so I could come home with armfuls of borrowed records. I was going to know more about music than anyone. I was going to be on *Mastermind*. Specialist subject: *The New Musical Express Encyclopedia of Rock*, 1978 edition.

It didn't take me long – Beefheart being early in the alphabet – before I found these words: *"The music this line-up put together was quite remarkable, all of it outstanding departures in the rock field. Trout Mask Replica is still one of the most advanced overall concepts in rock music."*

I got the library to order me a copy. When it finally arrived, I was only the second person who had ever borrowed it. The album came out in 1969, but the library hadn't acquired a copy until 1974. Two loans in four years didn't feel like a good sign.

I put it onto my dad's precious hi-fi with bated breath. From the get-go, it sounded terrible. So terrible that I lifted the needle in case anyone else in the house might hear the annoying din coming out of the speakers. Normally, annoying was good. But I now realised there were limits that even I wasn't prepared to go beyond.

I flipped the disc over, hoping the first side was some kind of aberration. It wasn't. Then I put the second disc on the turntable. Side three, track one: *Hair Pie: Bake 2*, a two-minute-and-twenty-three-second instrumental that I instantly knew was the worst piece of music ever recorded.

I would later take the album to parties, safe in the knowledge that if I put this track on, it would clear the room before the Second Pie was half-baked.

What kind of "advanced concept" was this? I clearly needed some assistance. Enter the font of all musical knowledge, the actual Last DJ, John Peel, and his life-shaping late-night show. Peel said: *"If there has been anything in the history of popular music which could be described as a work of art in a way that people who are involved in other areas of art would understand, then Trout Mask Replica is probably that work."*

He later ranked the record as the best pop album ever made. Ever-reliable musical-critic backstop Lester Bangs, in his original review for *Rolling Stone* in 1969, hailed the album as "a total success, a brilliant, stunning enlargement and clarification of [Captain Beefheart's] art", describing its lyrics as "an explosion of maniacal free-association incantations".

Clearly, I needed to persevere. Preferably in secret.

It took me a while. No doubt things were assisted when I spotted the heavenly vision that was Nicole Hyde, two years above me in the Upper Sixth, carrying a copy of the album. (I now realise that she is the only woman on the planet who liked the record. Ah, Nicole, where are you now?)

I can't remember precisely when it happened. There was no bolt of lightning, no celestial choir, no sudden revelation that *Hair Pie: Bake 2* might, after all, the greatest piece of music ever committed to vinyl. But at some point, something shifted. I stopped listening for the music I thought ought to be there and started listening to the music that actually was there.

And suddenly, it made sense. Not in the conventional way that a familiar melody or a satisfying chord progression makes sense. More like discovering that a language you'd assumed was gibberish had its own grammar, logic and extraordinary expressive power.

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The Captain had got me. And he has never quite let go since. Welcome to the Magic Band. *Trout Mask Replica*, released in 1969, is one of those albums that makes you wonder what planet its creator came from. Captain Beefheart – born Don Van Vliet – was a blues obsessive, a surrealist, a musical visionary and, by all accounts, a formidable force of nature.

The album was produced by his friend and former schoolmate Frank Zappa, but its musical world was unmistakably Beefheart's own. The story of its creation is almost as extraordinary as the record itself. Beefheart moved his young, impressionable backing group, the Magic Band, into a small rented suburban house at 4295 Ensenada Drive in Woodland Hills, Los Angeles. What followed has frequently been described by music historians and the band members themselves as a cult-like captivity. The band rehearsed for 14 hours or more every single day for roughly eight to nine months. Van Vliet strictly forbids the band members from leaving the house, except for rare, tightly controlled grocery or welfare-cheque trips. The band had virtually no money. Drummer John "Drumbo" French and guitarist Bill "Zoot Horn Rollo" Harkleroad later recounted surviving for an entire month on nothing but a single small cup of soybeans a day. At one point, band members were arrested for shoplifting food just to survive, and the album's producer, Frank Zappa, had to bail them out. Visitors described the musicians as looking completely "cadaverous". Then the psychological and physical abuse with Van Vliet exercising absolute dominance. He subjected the band to "barrel time", gruelling, days-long emotional interrogation sessions where a single member would be isolated and relentlessly berated by Beefheart and the rest of the manipulated band until they broke down completely. Physical violence was also used; French was once thrown down a flight of stairs for failing to accurately play a rhythm Beefheart had abstractly described as "a strawberry".

This wasn't a band getting together to jam and see what happened. It was closer to a musical boot camp, with Beefheart as commander-in-chief. The parts were often awkward, the rhythms unpredictable, the instructions idiosyncratic. Individual musicians had to master their own pieces before discovering how they fitted into the larger musical jigsaw.

A jigsaw that then came together when the band entered the studio. The rumour that the album was recorded in 15 hours is actually an overestimation. Because the band had been drilled so mercilessly for months, they were capable of playing highly complex, polyrhythmic, and erratic avant-garde arrangements with absolute flawless synchronicity. Such that, for the core session, when Frank Zappa finally took them into Whitney Studios in Glendale, California, the well-rehearsed Magic Band laid down all 20 instrumental backing tracks in a single six-hour session. While the physical playing of the instruments took only six hours, the entire process took slightly longer. Beefheart recorded his vocals and horn sections over the next few days. (Famously, he refused to wear headphones during overdubs, instead singing over the faint sound bleeding through the studio's glass window, which explains why his vocals are often slightly out of time with the music). Combined with a few field recordings captured on a portable recorder back at the house, the studio time for the musical tracking truly spanned less than a day's worth of collective hours.

The result sounds like chaos. It isn't. Or rather, it is chaos that has been painstakingly organised. The guitars weave in and out of one another, apparently ignoring the rules of rhythm and harmony. The drums seem to inhabit their own universe. The bass refuses to behave itself. And over the top, Beefheart delivers his lyrics in a voice that can sound like a blues shouter, a carnival barker, a man possessed or all three at once.

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Listen closely, though, and you begin to hear the extraordinary precision beneath the apparent disorder. The musicians are not playing randomly. They are executing a highly specific vision, full of interlocking patterns, unexpected accents and sudden changes of direction. It's an album that demands a different kind of listening. You don't so much follow the music as surrender to it.

And then there are the words. Beefheart's lyrics occupy a world somewhere between the blues, Lewis Carroll, Dadaist poetry and a particularly fevered dream. They are funny, absurd, occasionally profound and frequently impossible to explain. Take the immortal line: *“A squid eating dough in a polyethylene bag is fast and bulbous, got me?”*

Got you? Not remotely. But that's rather the point. The Captain isn't asking us to decode a secret message. He's inviting us into a world where words are sounds, images collide, logic takes a holiday and the absurd becomes a form of freedom. There is a warped Dadaist mischief here: a rejection of conventional ideas about what art should be, what language should mean and what music should sound like. The humour is essential. Without it, the album might feel like an endurance test. With it, the whole thing becomes a magnificent act of anarchic playfulness.

“Fast and bulbous” is enduringly funny (to me at least) because it sounds like it ought to mean something. It is also oddly satisfying to say. And once you've heard it, good luck getting it out of your head.

The album is full of these moments. Strange little phrases, bizarre characters and surreal images tumble over one another, delivered with such conviction that you find yourself accepting them as perfectly reasonable. Perhaps they are.

Musically, *Trout Mask Replica* is a gumbo of blues, free jazz and rock 'n' roll, with the ingredients thrown into the pot in proportions that no sensible chef would contemplate. The blues is the foundation. Beefheart loved its rawness, its emotional directness and its capacity to bend musical conventions. But he takes the blues apart, twists it, stretches it and puts it back together in unfamiliar shapes. Free jazz contributes the spirit of improvisational freedom and the refusal to respect established boundaries. Rock 'n' roll provides the energy, the attitude and the sheer physicality. Yet none of these descriptions quite captures what emerges. The album doesn't simply combine three genres. It creates a musical language of its own.

There are moments of astonishing beauty amid the apparent mayhem. There are passages that make you laugh out loud. There are rhythms that seem physically impossible, until you realise that the musicians are playing them with breathtaking accuracy. And there is an energy that conventional musical tidiness can rarely match. This is not music designed to make you comfortable. It is music designed to wake you up.

I never got to see the good Captain perform live. That remains one of my musical regrets. I did, however, have the privilege of seeing a later incarnation of the Magic Band play in Bristol back in 2013 and then again on the farewell tour in late 2017. Both were truly great nights. What struck me most was just how difficult the music was to play. These weren't musicians making a convincing approximation of the records. They were navigating the same fiendishly intricate musical architecture, negotiating those interlocking parts and improbable rhythms with extraordinary precision. And they clearly loved it. You could see the pleasure they took in the discipline, the challenge and the sheer exhilaration of getting it right. The audience reaction only added to the delight. Here was music that had once sounded to me like an intolerable racket, being performed by musicians who understood every twist and turn… and who knew exactly how astonishing it was.

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Listening today, I find myself thinking about that sixteen-year-old who had lifted the needle from his dad's hi-fi, convinced he'd discovered the worst music ever recorded. I wish I could have told him what was coming. Some albums reward you for liking them. Others reward you for learning how to listen to them. *Trout Mask Replica* does both, eventually. It remains one of the strangest, funniest, most challenging and most rewarding records I've ever heard. Fast and bulbous? Absolutely, Captain. Got me.

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Investments – Turning Polyethylene Into Gasoline



This month's investment isn't a company. It's an idea. Imagine taking one of the world's most abundant waste materials – polyethylene – and turning it into gasoline- and diesel-like fuels.

Now imagine doing it without the extreme temperatures normally associated with breaking plastics apart, without a noble-metal catalyst, without organic solvents, without external hydrogen, and without a separate chemical initiator. That is the intriguing proposition emerging from recent work at Oak Ridge National Laboratory.

It is still a laboratory technology, and there is a considerable distance between an interesting chemistry experiment and a commercially viable process. But this is one I would watch.

The obvious wow: Polyethylene is cheap, plentiful and difficult to get rid of. If we could reliably turn it into useful hydrocarbons at low cost, we would be addressing two problems at once: a waste problem and a resource problem.

Conventional plastic-to-fuel processes often rely on pyrolysis, with temperatures in the region of 450–500°C. The Oak Ridge researchers have demonstrated polyethylene conversion at temperatures below 200°C, using molten salts containing aluminium chloride. They report gasoline yields of around 60%.

But the really interesting part isn't simply the lower temperature. It is what the molten salt is doing. The less obvious wow. The molten salt is both the reaction medium and the catalytic environment.

When engineers encounter a difficult process, the instinct is often to add something.
Need the reaction to happen faster? Add a catalyst.
Need a different reaction environment? Add a solvent.
Need another ingredient? Add it.
Need more energy? Add energy.

The Oak Ridge researchers have found a different route. Instead of adding another component to perform the catalytic function, they have found that something already in the

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system can perform it. And that is where this becomes particularly interesting through a TRIZ lens.

One of TRIZ's most powerful ideas is the Ideal Final Result. I think of the IFR as a North Star. It isn't somewhere we realistically expect to arrive. Rather, it forces us to imagine a system in which the useful function happens with none – or much less – of the complexity, cost and resources normally required to make it happen. The question changes from, '*how can we make this complicated process better?'* to, '*how much of the process can we eliminate?*'

In the Oak Ridge example, the researchers haven't achieved an IFR. There are still significant challenges, including the stability and recovery of the hygroscopic molten salts, and we have yet to see whether the chemistry can be translated into an economically attractive industrial process. But they have taken an important leap in the right direction. They have effectively asked, 'do we really need to add another resource to perform this function… or is there already something here that can do it?'

This may be the most useful lesson in the whole story. When we look for an innovative solution, we tend to look outside the system for something new. TRIZ encourages us to look inside the system first. What resources are already there? What is currently performing one function that could perform another? What is being treated as a constraint that might actually become an enabler? What are we about to add that we might not need?

Sometimes the breakthrough isn't an extraordinary new component. It's recognising the extraordinary potential of an ordinary one. Why it's our Investment of the Month. The outsider's reason for watching this technology is straightforward: can we take an abundant, problematic waste stream and turn it into something valuable, using a process that could potentially be dramatically simpler and cheaper than today's alternatives?
If the answer eventually proves to be yes, that is a very big deal.

Read more:
Liqi Qiu, Felipe Polo-Garzon, Luke L. Daemen, Min-Jae Kim, Jinghua Guo, Bobby G. Sumpter, Michael R. Koehler, Carlos Alberto Steren, Tao Wang, Logan T Kearney, Tomonori Saito, Zhenzhen Yang, Sheng Dai. Polyethylene Upcycling to Liquid Alkanes in Molten Salts under Neat and External Hydrogen Source-Free Conditions. Journal of the American Chemical Society, 2025; 147 (19): 16207 DOI: 10.1021/jacs.5c01107

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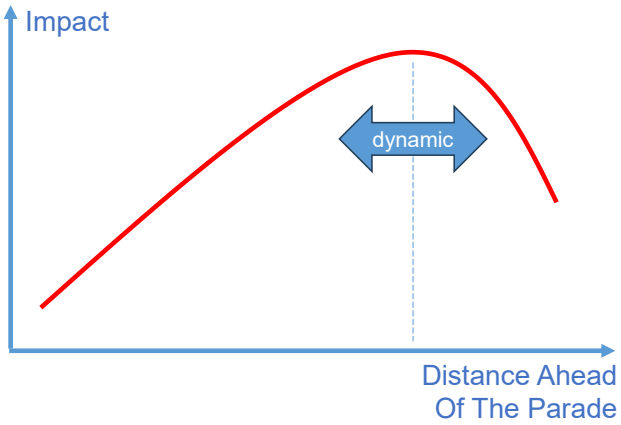
Generational Cycles – YBAs



Or: Leading the Parade – How the Young British Artists, a generation of Nomads and a remarkably receptive ecosystem changed the rules of the art world.

Artists have always had an awkward relationship with the societies they inhabit. Some reflect what is already happening. Others anticipate what is about to happen. A few seem to arrive from somewhere far enough ahead that nobody quite understands what they are doing. And somewhere between those positions lies a curious Goldilocks problem.

Imagine a parade representing the direction in which society is moving. An artist who walks exactly alongside it may be perfectly relevant, but is unlikely to change very much. An artist who races miles ahead may be visionary, but risks becoming incomprehensible. The artist who walks *just far enough ahead of the parade* can do something much more powerful: show everyone else what comes next. There is, in other words, an optimum distance ahead of the parade:



Too little distance and there is insufficient novelty. Too much and there is insufficient connection. In between lies a sweet spot where an idea is sufficiently unfamiliar to be interesting, sufficiently familiar to be understood and sufficiently provocative to make

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people want to follow. It is a Goldilocks Curve. But, as with every Goldilocks Curve, the optimum isn't fixed. It moves. And occasionally, something happens in the surrounding system that allows the artist to travel much further ahead of the parade while remaining on the productive part of the curve.

I think that is what happened to the Young British Artists (YBAs).

And I don't think it happened because the YBAs were necessarily the greatest artists of their generation.

It happened because they arrived at precisely the moment when the British art ecosystem was ready to turn a particular kind of generational rebellion into a cultural phenomenon.

The Nomads arrive

The artists who became known as the YBAs were born predominantly in the years 1962-65 and came of age during the transition from the Boomer to the Gen X generation.

The previous generation's artists had largely inherited the Boomer ‘Prophet’ traits and characteristics: artists as people with something to say about how society should change.

The Nomad behaves differently. The Nomad is suspicious of grand narratives, suspicious of authority and particularly suspicious of being told what they are supposed to do. The characteristic Nomad response is not, “Here is the better world we should build.” It is: “What happens if we do the opposite?”

The new generation of Nomad artists weren't simply trying to make better versions of the art that had preceded them. They were questioning the assumptions surrounding what counted as art, where art should be shown, who should decide whether it was good, how it should be sold, who should be allowed into the art world and, increasingly, what the relationship between art, money, celebrity and publicity might be. The artwork was only part of the experiment. The *system surrounding* the artwork became part of the artwork too.

Freeze

The moment usually identified as the beginning of the YBA phenomenon was *Freeze*, the exhibition organised by Damien Hirst (b1965) in a disused London Port Authority building in 1988.

Hirst was still a student at Goldsmiths. The exhibition brought together a group of young artists, many of whom had also studied at Goldsmiths, and announced something that was less a coherent artistic movement than a new attitude. They didn't wait for the established art world to invite them. They organised the exhibition themselves. They found the space. They promoted it. They created an event. They made themselves visible.

A conventional account of the YBAs might say that a group of talented young artists produced provocative new art and were subsequently discovered by the establishment. But that gets the causality backwards. They weren't simply discovered. *They created the conditions in which they could be discovered.* And once that started happening, the surrounding ecosystem began to amplify them.

The system joins in

This is where Rosie Millard's *The Tastemakers*, her history of the British art scene of the period, becomes particularly useful. The YBA story was never simply about a group of young (Alienated-Nomad) artists. There were (predominantly Narcissistic-Prophet) gallery

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owners. Dealers. Critics. Collectors. Institutions. Journalists. And, most famously, (early-Prophet, Boomer) Charles Saatchi.

Each had their own reasons for participating. The artist wanted recognition. The dealer wanted sales. The collector wanted access to something exciting. The critic wanted something worth writing about. The gallery wanted visitors. The media wanted a story.

Saatchi had the financial resources and appetite to acquire work from young artists and, in doing so, could confer an extraordinary degree of legitimacy.

None of these actors needed to be pursuing the same objective. In fact, they probably weren't. Yet their actions interacted.

And the interaction produced something that none of them could have created alone. This is what makes the YBA story so interesting from a systems perspective as well as a generational one. It looks, retrospectively, as though someone designed a movement. But there was no central architect. There was simply a self-organising ecosystem in which multiple actors discovered that their individual interests could reinforce one another. The artists supplied novelty. The galleries supplied infrastructure. The collectors supplied money. The critics supplied interpretation. The media supplied attention. The institutions supplied legitimacy. And the money and attention attracted more money and attention. A feedback loop began.

Controversy becomes an asset

The YBAs also understood something that was particularly well suited to the media environment of the time: controversy travels. An artwork doesn't need to be universally admired to become culturally important. In fact, it can be more useful if people disagree about it. Damien Hirst's work was provocative partly because it challenged assumptions about what an artwork was supposed to be. Tracey Emin's *My Bed*, although created later, became an almost perfect example of the phenomenon.



Here was an object that was extraordinarily ordinary: a bed, surrounded by the detritus of a period of Emin's (b1963) life. The question was not simply whether it was beautiful. The question was, ‘can this be art?’

That question is much more valuable to a cultural system than universal agreement.

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Because disagreement creates conversation. Conversation creates attention. Attention creates visibility. Visibility creates legitimacy. And legitimacy allows the next, slightly more radical proposition to enter the system. The parade moves.

The Goldilocks Curve moves too

This is where the YBA story becomes more interesting than a straightforward history of British art. The YBAs were not necessarily walking further ahead of the parade because they were inherently more radical than all the artists who had come before them. The *parade itself had changed.* The art world had already experienced decades of conceptual art, performance, installation and challenges to traditional artistic conventions. The audience was more prepared for provocation. The media environment was more willing to turn artists into personalities. Collectors were increasingly interested in contemporary art. Commercial galleries were increasingly sophisticated. And the emerging YBA ecosystem had found ways of making controversy commercially and culturally useful. The result was that the distance between an outrageous proposition and the point of rejection had increased. The Goldilocks Curve had moved, and an artist could now go considerably further ahead of the established cultural norm and remain within the zone of maximum impact. The YBAs did not simply move further ahead. They were able to move further ahead without falling off the curve. And, in some cases, they helped move the curve themselves.

The artist as ecosystem engineer

There is another reason the YBAs are so interesting. They didn't just make art. They changed the way art got made visible. *Freeze* was not simply an exhibition of artworks. It was an experiment in creating an audience. The artists organised themselves rather than waiting for institutional approval. They used unconventional spaces. They cultivated relationships with galleries and collectors. They created events that generated publicity. The boundary between artist, curator, promoter and entrepreneur became increasingly blurred. This is a very Nomad form of innovation. Rather than accepting the existing system and trying to succeed within it, the artists changed the system around themselves.

And yet this is where the story becomes paradoxical. They didn't overthrow the art establishment. They became the establishment. The rebels were absorbed. And perhaps more importantly, their rebellion became valuable.

The paradox of commercialisation

This is where the YBAs provide an unusually rich example of an innovation contradiction. The traditional artist might regard commercial success as a threat to artistic authenticity. If the work becomes too commercial, perhaps it ceases to be art. But the YBAs seemed much less interested in maintaining a clean separation. Money became part of the story. Celebrity became part of the story. Publicity became part of the story. The market itself became something to experiment with. The contradiction between artistic credibility and commercial success was not addressed by choosing one side, rather, the two became mutually reinforcing. Commercial success made the artists more visible. Visibility made them more controversial. Controversy generated publicity. Publicity generated cultural relevance. Cultural relevance generated more demand. And increased demand increased commercial value. The system had found a positive feedback loop.

Why are they still famous?

This is perhaps the strangest thing about the YBAs. More than three decades after *Freeze*, the YBAs remain the reference point for an era. New artists have appeared.

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New technologies have emerged. New artistic movements have come and gone. Yet Damien Hirst, Tracey Emin and their contemporaries remain remarkably prominent. Why? Perhaps because cultural memory doesn't necessarily preserve the objectively best work. It preserves *stories.* The YBAs created an exceptionally powerful story. Young artists. A disused building. A new generation. Provocation. Money. Collectors. Scandal. Celebrity. The Turner Prize. The shark. The bed. The headlines.

The art world suddenly became something the wider public could talk about. And the ecosystem reinforced itself. The more famous the artists became, the more valuable the story became. The more valuable the story became, the more attention it attracted. And the more attention it attracted, the more difficult it became for the next generation to displace it.

This is another systems phenomenon worth noticing. Success creates the conditions for continued success. ‘Just the right’ combination of Boomer Narcissism and Nomad Alienation converged. The YBAs didn't merely win the game. Their success changed the game in ways that helped preserve their position. And since their heyday, the ‘right’ combination of generational archetypes hasn’t repeated.

The system decides

There is a temptation when looking backwards at cultural history to search for the genius responsible. Who invented the movement? Who was the visionary? Who changed everything? In the YBA story, the answer is both easier and harder than it looks. There were certainly individuals who made extraordinary contributions. Hirst was an exceptional organiser and self-promoter as well as an artist. Emin developed a powerful and highly recognisable artistic voice. Saatchi possessed extraordinary financial resources and a willingness to take risks. Gallery owners, critics, collectors and curators each played their parts. But none of them created the YBA phenomenon alone. The system did.

This is another in what’s becoming a whole series of ‘the system decides’ articles and papers. The YBA case lets us see that the heuristic applies at the level of societal generation archetypes as well as the effective – or non-effective – functioning of a work team within and organisation. Everything that delivers a function, useful or otherwise, does so because a system permitted it (POSIWID!). And today, in our massively interdependent world, every system sits inside other systems. Turtles all the way. And everything is part of an ecosystem.

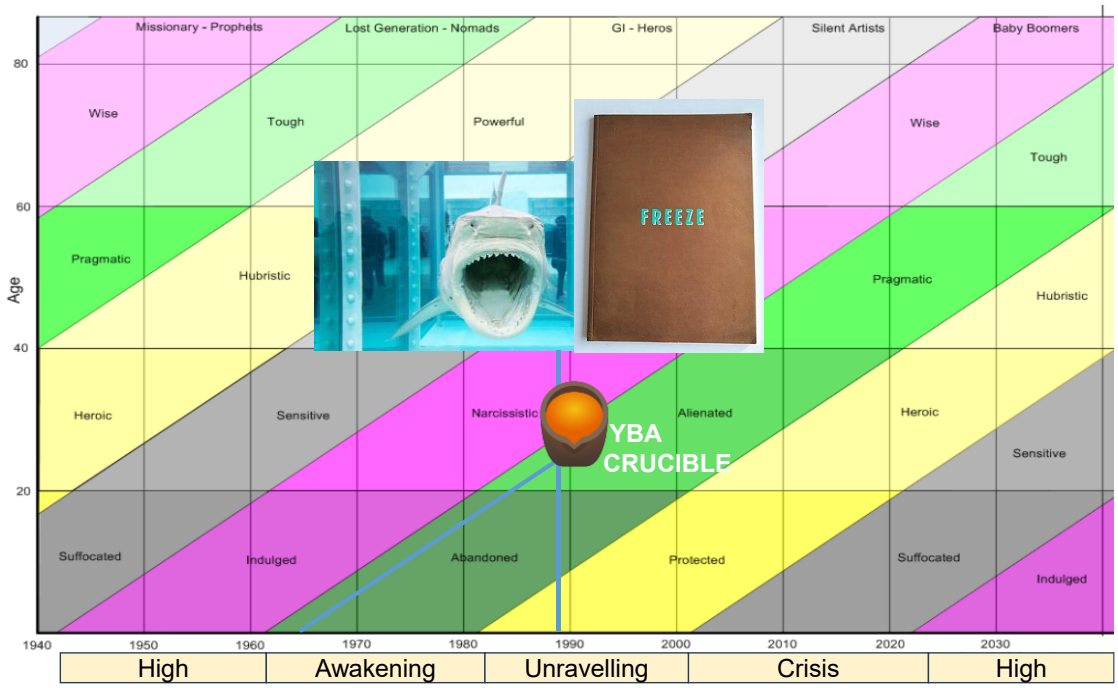
An ecosystem can amplify a relatively small signal into a major cultural event if enough of its components are aligned. And the alignment does not have to be deliberate. The artists, in the YBA case, did not need to share the collectors' motivations. The collectors did not need to share the critics' motivations. The critics did not need to share the gallery owners' motivations. They simply needed to find that their actions reinforced one another. That is self-organisation. And once the feedback loop was established, it became remarkably difficult to stop.

Leading the parade

This brings us back to the Goldilocks Curve. Artists lead the parade because their job, at least in part, is to explore possibilities before the rest of society is ready to adopt them. But there is a paradox. An artist who is not sufficiently ahead of the parade has little impact. An artist who is too far ahead may have no impact at all. The greatest cultural impact occurs somewhere in between. And the position of that sweet spot is constantly moving. The YBAs happened to arrive at an extraordinary generational flux moment. A generation of young Nomad artists had the instinct to reject convention and experiment

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with the opposite. A generation of Boomer gallery owners, critics and collectors had the experience, resources and appetite to recognise an opportunity. The media had an appetite for controversy. The commercial art market was ready to expand. And the wider culture was becoming receptive to a more provocative definition of art. The ecosystem was primed. The YBAs lit the blue touch paper. They were *the right artists for the system that emerged around them.* Their Nomad instinct to do the opposite supplied the novelty. The surrounding Boomer ecosystem supplied amplification. The Crucible was ready…



Every parade eventually catches up

There is one final implication. If the Goldilocks Curve is right, then every successful avant-garde movement carries the seeds of its own displacement. Once society has caught up with the artist, the artist is no longer sufficiently ahead. The once-outrageous becomes normal. The once-provocative becomes conventional. The once-radical becomes a museum exhibit. And the next generation has to move further ahead to find its own impact zone. This is where generations and innovation meet. The YBAs were Nomads doing what Nomads do: challenging the established order, refusing to accept inherited definitions and discovering what happened when they pushed in the opposite direction. But their lasting impact wasn't simply the result of that rebelliousness. It was the result of rebelliousness meeting a system capable of amplifying it.

Don't assume that the best idea wins. Don't even assume that the most radical idea wins. The idea that wins is often the one that happens to arrive at the point where the surrounding ecosystem can amplify it. The artist can lead the parade. But the parade decides how far it is willing to follow. And sometimes, when the conditions are just right, a small group of people who are prepared to walk far enough ahead can discover something remarkable: the system doesn't merely follow the innovators. The system decides which innovators become history.

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Biology – Tiger





The orange tiger that isn't. At first glance, the tiger seems to present one of nature's greatest puzzles. If you wanted to design the perfect ambush predator, would you really paint it bright orange? Against the greens and browns of a tropical forest, the tiger appears to stand out like a beacon. To our eyes, it seems almost impossible that such a vividly coloured animal could stalk prey successfully.

The pair of images above appear to confirm that intuition. The first shows the tiger as we humans see it. As trichromats, our eyes contain three types of colour-sensitive cone cells, allowing us to distinguish reds, greens and blues with remarkable precision. The tiger's rich orange coat contrasts strongly with the surrounding vegetation, making it surprisingly easy to spot.

Then comes the surprise. The second image shows exactly the same scene as it might appear to one of the tiger's principal prey species, such as a deer. Deer are dichromats. With only two types of colour-sensitive cone cells, their perception of colour is very different from ours. The vivid orange almost disappears, blending into tones that closely resemble the surrounding foliage. Combined with the tiger's dark stripes, which disrupt the outline of its body, the result is an animal that becomes astonishingly difficult to distinguish from its background.

Suddenly, what looked like one of evolution's greatest mistakes becomes one of its most elegant solutions. The obvious question is why evolution didn't simply make tigers green.

The answer is that there was never any need. Camouflage is not about matching the colours that *we* see. It is about matching the colours seen by the animals that matter. Evolution is wonderfully indifferent to human perception. Natural selection rewards what

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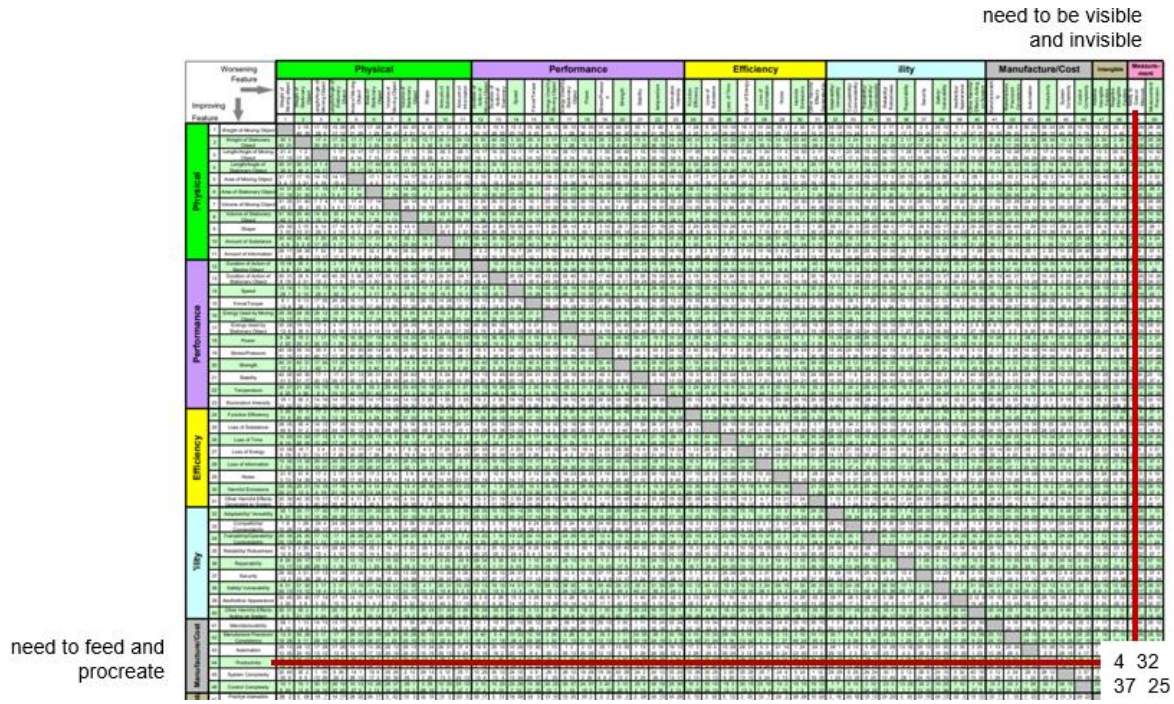
SYSTEM ATIC INNOVAT ION

improves survival and reproductive success, not what looks convincing to visiting photographers or wildlife enthusiasts. This leads us directly to a fascinating contradiction.

A tiger benefits from remaining undetected while hunting, yet it must also be recognisable to other tigers during the relatively rare occasions when they meet to establish territories or find mates. At first sight, these seem to be conflicting requirements. Becoming more conspicuous risks alerting prey; becoming less conspicuous risks making communication with other tigers more difficult. Traditional engineering often resolves such contradictions through compromise. Make something a little more visible and accept that it becomes a little less concealed.

Evolution has found a much cleverer answer. Rather than changing the tiger, it changes the *meaning* of visibility.

Readers may recognise this as a classic Productivity versus Ability to Detect conflict. Here's what that contradiction looked like when mapped onto the Contradiction Matrix:



Principle 37 encourages us to ask whether the problem really is absolute, or whether it depends on the frame of reference. Here, detectability is not an intrinsic property of the tiger at all. It depends entirely on the visual system of the observer. To another tiger, equipped with trichromatic vision, the orange coat remains highly distinctive. To a deer, with dichromatic vision, much of that distinction simply disappears.

Principle 32 then provides the physical means by which the contradiction is resolved. Evolution has selected a coat colour that occupies a particularly clever position in colour space. To one observer it appears brilliantly orange; to another it merges naturally into the forest background. The tiger has not literally changed colour, yet it has evolved a colour that produces two entirely different perceptions.

This is not a compromise between visibility and camouflage. It is the elimination of the contradiction itself.

The photographs reveal something that is difficult to appreciate from words alone. They remind us that every organism experiences its own version of reality, shaped by the

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capabilities and limitations of its sensory systems. The jungle seen by a human is not the same jungle experienced by a deer, just as it is not the same jungle experienced by a bee, a snake or a tiger.

Nature didn't invent a better camouflage. It invented a better definition of camouflage.

And, in true TRIZ fashion, the highest-level solution wasn't to optimise the object, it was to redefine the system. The tiger's coat hasn't evolved to fool the jungle; it has evolved to fool the eye that's looking at it.

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Genrikh Altshuller at 100: Standing Too Far Ahead of the Parade



Today marks 100 years since the birth of Genrikh Altshuller.

I never met him.

The closest I came was a rumour that he might sign copies of his newly published ‘Innovation Algorithm’ book published through the Altshuller Institute in the US. The year before my first TRIZCON in 1999. Sadly, he passed away before the books could be shipped back and forth across the Atlantic. The thought that I might acquire a copy of a signed book from the man I’d admired for so long turned out to be a momentary wish that would never be granted.

And yet, in a strange way, I feel like I have spent much of the last 35 years in conversation with him. It began in 1991, when I was working at Rolls-Royce. I first came across the 40 Inventive Principles of TRIZ. They immediately intrigued me. Here was a suggestion – an outrageous suggestion, to some of my colleagues – that invention might not simply be a mysterious act of genius. Perhaps there were patterns. Perhaps the same kinds of problems had been solved before. Perhaps there was something systematic to be learned from the world's inventors.

I wanted to know more. I needed to know more. My search led me to Altshuller's *Creativity As An Exact Science*. The Rolls-Royce library requested a copy on loan from the British Library. Six weeks later, it arrived. I remember looking at it and seeing that I was the third person in Britain ever to have opened it. Convinced that this might be the only copy in the country, I am now slightly embarrassed to admit that I surreptitiously photocopied every page and made my own copy. That copy became rather important.

“Nothing invented outside Rolls-Royce could possibly be any good”
Rolls-Royce in those days was a rather arrogant company. Or perhaps, more accurately, the engineers were. There was a fairly widespread belief that if something had been

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invented outside Rolls-Royce, it probably wasn't good enough. And so, when I began trying to spread the word about Altshuller's extraordinary proposition – that creativity could be an exact science – the scepticism was almost absurd. Surely creativity couldn't be systematised. Surely there couldn't possibly be only 40 Inventive Principles. Surely somebody somewhere had misunderstood something.

So we did what Rolls-Royce engineers do. We spent the next three years trying to prove him wrong. We looked for more principles. We challenged the patterns. We tested the ideas against real problems. We searched for the holes in the theory.

And, along the way, something rather inconvenient happened. We generated dozens of patent applications. Eventually, we began to realise that we'd been asking the wrong question. The question wasn't, 'was Altshuller right?' The real question was, 'was it useful? That distinction has stayed with me ever since.

No methodology is the truth. No model captures the entire complexity of reality. No set of principles can possibly describe every act of invention. But if a body of knowledge repeatedly helps people solve problems that they were previously unable to solve, perhaps arguing about whether it is *perfectly right* is missing the point.

Altshuller's work was useful. Very useful.

The book in the drawer

After the initial excitement, something rather curious happened. Altshuller's work faded from view. I don't know whether other engineers in the Company had the same experience, but I found myself returning to *Creativity As An Exact Science* whenever I needed fresh impetus on a difficult problem.

Only I did it quietly. The illegally copied book lived hidden in a drawer in my desk. Perhaps that was because the scepticism had never entirely gone away. Perhaps it was simply easier not to have the conversation. But whenever conventional thinking ran out of ideas, there was Altshuller, waiting in the drawer. And, remarkably often, he had something useful to say.

Building on the foundation

When I eventually left Rolls-Royce to establish what has now become Systematic Innovation, I knew exactly where the foundations would lie. Altshuller's work would be central. But we also knew that the work could not simply stand still. Altshuller had started something enormous. He had demonstrated that invention could be studied systematically, that recurring patterns could be discovered, and that those patterns could be made available to other people.

The research needed to continue. And the tools needed to become easier to use and easier to teach. There was another principle that mattered to us too. Altshuller had always made clear that his work was intended for the benefit of mankind. So we made an early decision: once our research had paid for itself, the resulting tools would be made freely available. It seemed the right way to honour the spirit in which the work had begun.

The great unfinished story

After Altshuller's death, something else became apparent. The TRIZ world had lost its centre of gravity. We tried, in our own small way, to help reunite it. The real competition, as far as we were concerned, wasn't another group of TRIZ practitioners. It was Big Consulting and all the organisations offering clients expensive but largely conventional ways of thinking about innovation. But the vacuum left by Altshuller's passing created a

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different dynamic. The anointed TRIZ Masters often seemed happier arguing with one another.

That always struck me as a tragedy. Here was a body of knowledge intended to help humanity solve difficult problems… and too much energy was being spent debating ownership of the intellectual territory.

We even at one point tried to raise the money to make a film about Altshuller's life. There was no interest. Which also remains astonishing to me. His story was – and still is – an extraordinary one. A young Soviet engineer who decided to study invention. A man who wrote letters to inventors asking how they had made their discoveries. A researcher who began to uncover patterns in millions of patents. A thinker who dared to suggest that creativity might be made systematic. And spent time in a Gulag for his troubles. If ever there was a story that deserved to be told on film, surely this is one. Perhaps one day it will be. If there's any justice it will.

Standing too far ahead of the parade

There is an expression about people who are so far ahead of their time that they appear to be standing alone. I sometimes think Altshuller was standing too far ahead of the parade. His ideas were difficult enough to accept in the middle of the twentieth century. Perhaps they were still too difficult to accept in the first two decades of the twenty-first. And perhaps even now, we haven't quite caught up with him. But I have a suspicion that we may be getting closer.

The current excitement surrounding artificial intelligence has reopened some very old questions. Can creativity be systematised? Can invention be accelerated? Can we learn from the accumulated knowledge of previous solutions? Can machines help humans navigate the enormous space of possible ideas? These are not entirely new questions. Altshuller was asking them decades ago.

I have heard Satya Nadella quoted as saying that the AI industry may be "one innovation" away from Artificial General Intelligence. I suspect it is probably more like fifty-seven (see my 14 September blog article). And I suspect Altshuller knew what eight of them were back in the 1960s.

Such is life.

Some people receive recognition for their world-changing contributions during their lifetime. Others have to wait. Sometimes for decades.

Perhaps his time is coming

I never met Genrikh Altshuller. I never had the opportunity to thank him personally for the direction he gave my career. I never got to tell him about the engineers at Rolls-Royce who spent three years trying to prove him wrong, and accidentally generated dozens of patent applications in the process. I never got to tell him that the book I secretly photocopied in 1991 would become part of the intellectual foundation for an organisation that has now spent decades continuing the research journey he began. And I never got to tell him that, whenever the world seemed to be running out of ideas, I still found myself metaphorically opening that drawer. But perhaps that is the nature of real intellectual influence. You don't have to meet someone for them to change the way you think. Altshuller gave me – and a small but eager coterie of others – a different way of looking at invention. Not as magic. Not as a gift bestowed upon a fortunate few. But as something that could be studied. Something that could be understood. Something that could be learned. He called it *Creativity As An Exact Science*.

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Perhaps the science was never going to be entirely exact. But the idea was important enough to change lives. It certainly changed mine. And as we today celebrate the centenary of his birth, I find myself wondering whether the rest of the world may finally be ready to catch up. One day soon, I think, Altshuller's time will come.

It would be nice to think that his hundredth birthday might mark the tipping point.

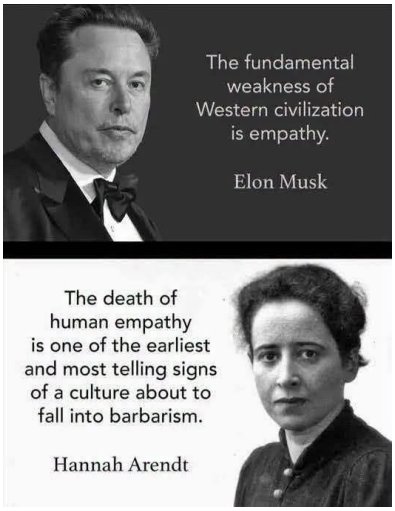
Happy centenary, Genrikh.

Here’s to the parade finally catching up with you.

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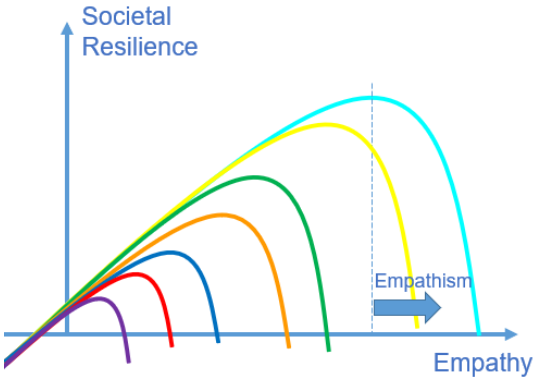
Contradiction?

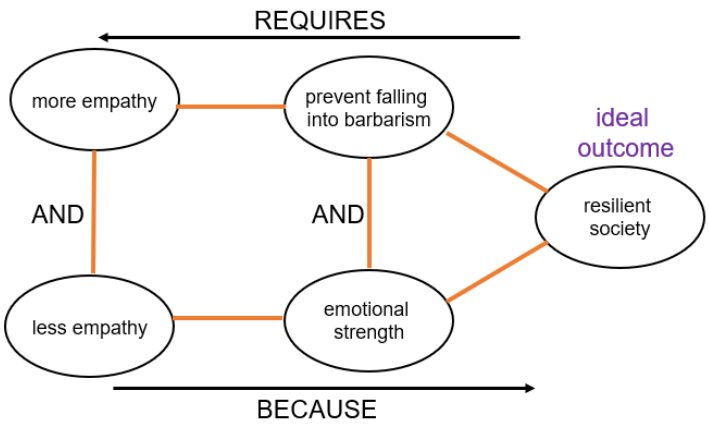


Recognition?

	Empathy Radius	Empathy Means…
Tribal	Tribe	Caring for family, kin and tribe. "If one of us hurts, we all hurt." Strong in-group empathy.
Feudal	Allies	Protecting allies and rewarding loyalty. Compassion exists, but strength comes first. Weakness may invite exploitation.
Order	Community	Compassion guided by duty and moral rules. Care for those who deserve it or belong within the moral community. No ambiguity.
Scientific	Network	Emotional intelligence is valuable because it improves performance and cooperation. Many shades of empathy.
Communitarian	Everyone	Every person's experience matters equally. Inclusion, diversity and emotional validation become central virtues.
Holarchy	Every Worldview	Systemic understanding of the needs, constraints and developmental stage of every perspective (especially dissenters).
Holistic	Whole System	Compassion for the entire living system. The experiences of individuals, societies & ecosystems are interconnected manifestations of the same whole.

Resolution?





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News

TRIZCON

This year's TRZCON, which was scheduled to take place in Guanajuato, Mexico, has now shifted to be a fully online event. Consequently, the pre- and post- conference events (including Darrell's planned workshop) have been cancelled. The two days of paper presentations – including Darrell's keynote, and the joint Vela paper with Shana Finnegan – will take place as per the original conference schedule. Check out trizcon.org for registration and details…

Vela

…it remains the plan that Shana and Darrell will be (soft-) launching the latest iteration of our AI agent, Vela, at the conference through our 'Vela: From Creativity as an Exact Science to Systematic Innovation – Finding the Missing 99%' paper. Vela is pretty much ready, the remaining challenge is working out the various different usage levels. Be at the conference for the big reveal…

Techno-Future Summit

The 14th year of "Techno-Future: A Summit for Change Leaders" will take place on April 8–9, 2027. In light of our recent work showing that while most AI deployments inside organisations are beginning to deliver marginal efficiency gains, those gains are being outweighed by a reduction in overall business adaptive capacity and effectiveness, Darrell has been asked to give a keynote… hopefully identifying some of the start-applying-tomorrow solution strategies. The Summit is largely online, so anyone can join.

New Projects

This month's new projects from around the Network:

NGO – Creativity Assessment Project
NGO – Bulletproof Patent Project
Government – Innovation Strategy Project
Education – Vela Deployment Project
FMCG – Consumer Insighting Project
Electronics – ICMM Analysis & Reporting
Commodities – Innovation Strategy Benchmarking Study
Automotive – SI Workshops
Energy – SI Workshops

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